Mozambique - Road Rehabilitation & Construction

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Overview

Identification

COUNTRY
Mozambique

EVALUATION TITLE
Road Rehabilitation & Construction

TRANSLATED TITLE
Serviços de Avaliação Independente do MCC Moçambique, em apoio ao Projecto de Reabilitação de Estradas

EVALUATION TYPE
Independent Performance Evaluation

ID NUMBER
DDI-MCC-MOZ-PE-TRANS-2019-v01

Version

VERSION DESCRIPTION
Anonymized dataset for public distribution

Overview

ABSTRACT
The methodology for this evaluation comprises a performance evaluation and an economic analysis. The economic analysis while not the central focus of the evaluation, is a pinnacle aspect of the evaluation. It seeks to discover whether investments financed by the MCC created the intended Economic Rate of Return (ERR). The evaluation also seeks to discover if and how economic benefits, in the form of reduced vehicle operating costs and time savings, are experienced and captured by stakeholders. In general terms, the economic analysis is a comparison between the costs necessary to improve roads in Mozambique to the expected benefits that result. Costs include rehabilitation and construction costs, and routine and periodic maintenance costs. The nature of benefits that are realized from improving roads can vary. As a proxy, and in line with MCC's Principles to Practice research, the economic analysis estimates economic benefits by calculating the decline in vehicle operating costs and time savings for users of the roads built with MCC grants. A portion of the data collected under all research areas will feed into the assumptions that inform economic analysis.

The economic analysis identifies and unpacks the underpinning drivers of Economic Rate of Return changes over time and provides learning regarding what MCC can do to promote better ERR for future similar road investment projects. In HDM-IV, the evaluation's economic analysis model, the primary drivers of the economic analysis are traffic count, vehicle operating cost (VOC), travel time, IRI, and investment costs. Examples of potential lessons the analysis may generate include ways to avoid under-designed roads that result in excessive maintenance costs or over-designed roads that result in excessive construction costs.

The performance evaluation will identify factors in project implementation that influenced economic results. It will also provide depth and narrative around economic analysis results so that economic results are better understood by the project's stakeholders. The performance evaluation also complies with MCC's requirement that each project conduct an independent evaluation that measures the achievement of results.

The evaluation design uses a mixed method approach, comprising qualitative and quantitative data collection from primary and relevant secondary sources. Primary data collection utilizes targeted sampling for the various proposed surveys, for example: Origin-Destination surveys, engineering assessments, traffic counts, journey times calculations, and axle loading measurements. Appropriate sampling strategies have been developed which take the evaluability assessment findings into consideration.

Research Question 0:

Was the project implemented according to plan? Were there any deviations from the original design? If so, these should be documented to the greatest extent possible.

Research Question 1: What is the economic return – calculated in terms of vehicle operating cost (VOC) savings and travel time (TT) savings – of the road investment? What factors drove changes to the Economic Rate of Return (ERR) over time? How could the project have been designed to result in a higher ERR?

Research Question 2A: What are the relevant road authority's current maintenance practices and what is the likelihood that MCC's investment will remain adequately maintained for the life of the investment? Based on this assessment, what set of maintenance assumptions should be used in the HDM-4 model to yield the best estimate of the costs and benefits of the road investment?

Research Question 2B: In cases where MCC invested in improving maintenance practices or included a maintenance Conditions Precedent in the Compact (applicable to Mozambique), what were the effects of those efforts and why?

Research Question 2C: What political, and economic incentives are shaping road maintenance decisions in the country? And what other key factors are influencing actual maintenance practices?

Research Question 3A: Who is traveling on the road, why, what they are transporting, what they are paying for transport, and how long does it take to move along key routes?

Research Question 3B: Have road usage patterns changed, in terms of who is traveling on the road, why, what they are transporting, what they are paying for transport, and how long it takes to move along key routes?

Research Question 4: How is the transportation market structured and what is the likelihood that VOC savings will be passed on to consumers of transportation services?

EVALUATION METHODOLOGY
Independent Ex-Post ERR and HDM-4

UNITS OF ANALYSIS
Individuals, enterprise, administrative units, other

KIND OF DATA
Other

TOPICS

Topic	Vocabulary	URI
Transportation	MCC Sector	

KEYWORDS
Mozambique, Mozambique Compact, Roads, Infrastructure, HDM-4, ERR, Transportation, Evaluation

Coverage

GEOGRAPHIC COVERAGE
The project rehabilitated two roads:

· Namialo - Rio Lurio: 149.7 km (this segment was split into two contracts Namialo - Metuchi Bridge approximately 75km and Metuchi Bridge - Rio Lurio approximately 75km)

· Nampula - Rio Ligonha: 103 km

Regional, Nacala, Nampula province

UNIVERSE
Road usuers

Producers and Sponsors

PRIMARY INVESTIGATOR(S)

Name	Affiliation
IMC Worldwide, Inc.	

FUNDING

Name	Abbreviation	Role
Millennium Challenge Corporation	MCC	

Metadata Production

METADATA PRODUCED BY

Name	Abbreviation	Affiliation	Role
Millennium Challenge Corporation	MCC		Review of Metadata

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2019-05-27

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MCC Compact and Program

COMPACT OR THRESHOLD
Mozambique Compact

PROGRAM
The overall goal of the Compact, implemented from 2008-2013, was to reduce poverty through economic growth in the four Northern provinces of Mozambique (Niassa, Cabo Delgado, Nampula, and Zambézia). The Compact had four primary objectives, each of which were supported by a distinct project: 1) Increase access to reliable sources of potable water supply and improved sanitation facilities (Water Supply and Sanitation Project), 2) Increase access to productive resources and markets while reducing transport costs (Roads Rehabilitation Project), 3) Establish efficient and secure land access for households, communities, and investors (Land Tenure Services Project), and 4) Protect and restore healthy coconut supply, and diversity farmers' income (Farmer Income Support Project). The evaluation services sought pertain only to the Roads Rehabilitation investment. The objective of the Roads Project was to improve access to markets, resources, and services; reduce transport costs for the private sector to facilitate investment and commercial traffic; expand connectivity across the northern region and with the southern half of the country; and increase public transport access for individuals to take advantage of employment and other economic opportunities.

MCC SECTOR
Transport (Trans)

PROGRAM LOGIC
The goal of the Compact, presented more clearly in the Compact's logic model compared to other project documents, states that the highest-level goal was to contribute to poverty reduction through economic growth in Northern Mozambique. The overall objective of the Compact was to increase productivity in Northern Mozambique. Differently stated, the four Compact projects (components) were intended to increase productivity leading to reduced poverty. It is unclear if the Compact's authors and the Roads Project's designers and implementers agreed on the outcome-level objectives that would produce those higher-level goals. The Compact's logic model describes the main outcome of the Roads Project as increasing access to resources and markets. The Roads Project's logic lists both increased income to households, presumably through increased access to markets, and includes reduced costs, which were not included in the Compact model. However, the outcomes described in the Compact logic model were not incorporated into the Roads Project's monitoring and evaluation plans. The Compact-wide monitoring and evaluation plan does list “household income” as a Compact goal but does not include a measurement of the Road Project Logic's contribution to that goal, as implied by the project logic model above. The Roads Project Logic's indicator tracking table includes as its outcome indicators change in international roughness index

(IRI), total time savings, and average annual daily volume. Road quality is listed as an output indicator in the project logic model, of which the IRI is a proxy indicator. Time savings is a component of reduced transportation costs, though not a sufficient measurement, and represented as an outcome objective in the project model. However, it is unclear if the project designers connected average annual daily traffic volume in the project logic model to outcomes such as reduced costs and increased household income. The monitoring and evaluation plan comments that project managers determined it was too costly to measure the connection between the Roads Project Logic's outputs and intended outcomes such as “household income and welfare.” The plan commits to requiring that contractors produce “detailed social assessments.” However, at the time of writing, the evaluation team has not received evidence that these “detailed social assessments” (other than coverage in ESIAs) were actually produced.

PROGRAM PARTICIPANTS

Road users

Sampling

Study Population

Road usuers

Sampling Procedure

Origin-Destination Survey
The evaluation team will conduct the survey over three 24-hour time periods comprising two weekdays and one weekend day. O-D Surveys will be completed on each of the main road sections. For suggested locations of O-D enumerators, please see the maps included as Annex A to the EDR. The aim of intercept locations is to ensure that diversions are unavailable and that a high proportion of travelers are engaged. Interviewers will be trained prior to undertaking the surveys. Each enumerator will use a handheld electronic device to record respondents' answers to specific questions. Enumerators will explain the purpose of each question to respondents and the potential use of the data to maximize the chance of complete and thorough responses to questions. The evaluation will use map analysis to better understand origin - destination data. Data collected through traffic counts and origin and destination surveys will allow the team to estimate results for the total road user population. The team aims for a 30 percent sample rate over the time of the survey. The team assumes that traffic volume is large enough that a 30 percent rate will lead to an oversample of vehicles. If traffic is low on the roads, the targeted rate may increase. Data collected will be uploaded to a central server managed on the Google Cloud Platform. Data will be analyzed using the R statistical environment to provide summary statistics on the data collected through the survey.

Traffic Count Survey
A manual traffic count will be conducted in 15-minute intervals for each direction of flow on both roads as outlined in Annex A of the EDR. The Manual Traffic Count will be conducted using A4 or letter size notebooks or sheets of paper with space for four 15-minute intervals will be used with pre-set depictions of numerical and vehicle categorization. The evaluation team will conduct the survey over three 24-hour time periods comprising two weekdays and one weekend day in mid-July or August. All vehicles traveling on the road during the times of data collection will be counted. Data collected on enumerators devices is uploaded to a central server managed on the Google Cloud Platform. Data transferred from each counting station will be used to formulate bi-directional (two way) traffic flows by vehicle class for each day and calculate the 3-day average to estimate the average daily traffic (ADT). We will then convert the ADT data to annual average daily traffic (AADT) by applying a seasonal correction factor to be provided by ANE.

Key Informant Interviews (KIIs)
The evaluation team will conduct the interviews over the course of four days in Maputo and Nampula as required. Operator staff, transportation workers, and municipal authorities (may be expanded to encompase more respondent groups) will be interviewed by the evaluation team using an interview guide. The interviewee will conduct the interview as a semi-structured discussion, following useful tangents and divergences as they occur. The interviewer will take notes in a notebook or computer according to the interviewer's preference. Interviewers will write up interview notes at the end of each work day to ensure that notes are accurate, of high quality, and main points are fresh in the interviewer's mind. An evaluation team member will read through the interview notes when they are completed, identifying key themes and patterns, that the team member will name and use to code the interviews. The team member will create an excel spreadsheet with individual interviews as rows and codes as columns. The team member will interview specific responses from each interview under each code. This qualitative data will be used to add explanation and narrative depth to the explanations of how road usage has changed.

Questionnaires

Overview

Intercept surveys and KIIs

Data Collection

Questionnaires

Intercept surveys and KIIs

Data Processing

No content available

Data Appraisal

No content available